

S/N 10/583,901

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Schiavon et al.	Examiner:	Menon, Krishnan
Serial No.:	10/583,901	Group Art Unit:	1777
Filed:	June 21, 2006	Docket No.:	758.1537USWO
Title:	LIQUID FILTER ASSEMBLY; AND, METHODS		

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Exhibit A

Pending Claims Corresponding to USSN 12/310,468  
Submitted September 20, 2011



### **Listing of Claims:**

1. (Original) A filter cartridge comprising:
  - (a) a primary filter cartridge section comprising media surrounding a central volume and defining a central axis;
  - (b) a bypass filter cartridge section including media surrounding a central volume and defining a central axis;
  - (c) a first end cap positioned between the primary filter cartridge section and the bypass filter cartridge section;
    - (i) the primary filter cartridge section and the bypass filter cartridge section each being secured in the filter cartridge;
    - (ii) the first end cap being an open end cap;
  - (d) a seal support surrounded by the media of the bypass filter cartridge section;
    - (i) the seal support including a first inner seal member defining a first inwardly directed seal; the first inwardly directed seal being positioned in a slanted seal plane non-orthogonal to the central axis of the bypass filter cartridge section; and,
  - (e) a second end cap positioned at an opposite end of the primary filter cartridge section from the first end cap;
    - (i) the second end cap being an open end cap and including a tubular, axial, projection and having a radially outer surface; and,
    - (ii) a housing seal member positioned around the radially outer surface of the tubular extension of the second end cap.
2. (Original) A filter cartridge according to claim 1 wherein:
  - (a) the first inner seal member of the seal support defines the inwardly directed seal in the slanted seal plane extending at an acute angle,  $x$ , within the range of  $4^{\circ}$  to  $20^{\circ}$  inclusive, with respect to a plane orthogonal to the central axis of the bypass filter cartridge section.



3. (Currently Amended) A filter cartridge according to ~~any one of claims 1 and 2~~ claim 1 wherein:
- (a) the seal support includes a second inner seal member thereon spaced axially from the first seal member and defining a second inwardly directed seal; the second inwardly directed seal extending in a seal plane orthogonal to the central axis of the bypass filter cartridge section; and,
  - (b) the first inner seal member on the seal support is positioned between the second inner seal member and the primary filter cartridge section.
4. (Original) A filter cartridge according to claim 3 wherein:
- (a) the seal support includes an outer sidewall perforate in selected locations that are between the first seal member and the second seal member.
5. (Currently Amended) A filter cartridge according to ~~any one of claims 3 and 4~~ claim 3 wherein:
- (a) the second inner seal member on the seal support defines a larger inside seal size than does the first inner seal member in the seal support.
6. (Currently Amended) A filter cartridge according to ~~any one of claims 1-5~~ claim 1 wherein:
- (a) the seal support includes a sidewall section with a first key slot thereon;
    - (i) the first key slot being spaced from the first seal member in a direction opposite the primary filter cartridge section and extending in a direction away from the primary filter cartridge section.
7. (Currently Amended) A filter cartridge according to ~~any one of claims 1-6~~ claim 1 wherein:
- (a) the seal support includes a sidewall section defining a first opening therethrough; the first opening being positioned spaced from the first seal



member and being positioned between the first seal member and the primary filter cartridge section.

8. (Original) A filter cartridge according to claim 7 wherein:

- (a) the first opening in the seal support sidewall section is in communication with a first axial surface of the seal support;
  - (i) the first axial surface of the seal support being a surface directed away from the first seal member and toward the primary filter cartridge section.

9. (Currently Amended) A filter cartridge according to ~~any one of claims 1-8~~ claim 1 wherein:

- (a) the seal support includes an inner shoulder directed toward the primary filter cartridge;
- (b) the first end cap includes an axial projection directed toward the inner shoulder of the seal support; and,
- (c) the first inner seal member is positioned on the inner shoulder of the seal support between the inner shoulder and the axial projection of the first end cap.

10. (Currently Amended) A filter cartridge according to ~~any one of claims 1-9~~ claim 1 wherein:

- (a) the first seal member is an o-ring.

11. (Currently Amended) A filter cartridge according to ~~any one of claims 1-10~~ claim 1 wherein:

- (a) the second seal member is an o-ring.

12. (Currently Amended) A filter cartridge according to ~~any one of claims 1-11~~ claim 1 wherein:



- (a) the housing seal member positioned around the tubular extension of the second end cap is an o-ring.

13. (Currently Amended) A filter cartridge according to ~~any one of claims 1-12~~ claim 1 wherein:

- (a) the media of the primary filter cartridge section comprises pleated media.

14. (Original) A liquid filter assembly including:

- (a) a housing defining an interior and having a filter head section with a liquid flow inlet arrangement and a liquid flow outlet arrangement;
  - (i) the housing including a depending sidewall section extending downwardly from the filter head section and having a lower end remote from the filter head section; and,
- (b) a valve sub-assembly including a frame piece having an upper section, a lower section and a central seal support flange between the upper and lower sections;
  - (i) the frame piece being secured to the depending sidewall section of the housing with:
    - (A) the central seal support flange sealed to the lower end of the depending sidewall with a seal therebetween;
    - (B) the upper section of the frame piece extending upwardly into a volume surrounded by the depending sidewall section; and,
    - (C) the lower section of the frame projection extending downwardly from the depending sidewall section;
  - (ii) a tubular bypass valve member positioned surrounded by the upper section of the frame piece;
    - (A) the upper section of the frame piece including an outer wall with a flow opening arrangement therein;
    - (B) the upper section of the frame piece including an axially open flow end; and,



- (C) the tubular bypass valve member being biased by a spring member into a closed position wherein:
  - (1) the tubular bypass member closes the upper section of the frame piece of the valve sub-assembly to flow therethrough from a region exterior to the upper section of the frame piece to the axially open flow end of the upper section of the frame piece; and,
  - (2) the tubular bypass valve member being capable of bias, against the spring member, to an open position wherein the tubular bypass member opens the upper section of the frame piece of the valve sub-assembly to flow therethrough from a region exterior to the upper section of the frame piece to the axially open flow end of the upper section of the frame piece;
- (iii) the lower section of the frame piece of the valve sub-assembly including: an open axial end remote from the central seal support flange; and, a sidewall having flow openings therethrough; and,
- (iv) a valve member positioned over the open axial end of the lower section of the frame piece of the valve sub-assembly;
- (c) a suction filter assembly secured to the liquid filter assembly around the lower section of the frame piece of the valve sub-assembly; and,
- (d) a filter cartridge in accord with claim 1 positioned within the housing with:
  - (i) the housing seal member on the second end cap sealed to the housing in a manner separating the filter head section into inlet and outlet flow regions; and,
  - (ii) the first inner seal member on the seal support sealed to, and around, the upper section of the frame piece of the valve sub-assembly.

15. (Original) A liquid filter assembly according to claim 14 wherein:



- (a) the upper section of the frame piece of the valve sub-assembly includes a key projection thereon;
  - (i) the key projection being spaced from an upper end of the upper section of the frame piece and extending toward the central seal support on the frame piece; and,
  - (ii) the filter cartridge being in accord with claim 6 and being positioned with:
    - (i) the key slot on the seal support receiving the key projection on the frame piece; and,
    - (ii) the first inner seal member having a position extending above the key projection.

16. (Original) A liquid filter assembly according to claim 15 wherein:

- (a) the upper section of the frame piece of the valve sub-assembly includes a gap in communication with the upper end of the frame piece of the valve sub-assembly; and,
- (b) the first inner seal member includes a portion extending underneath the gap in the upper section of the frame piece.

17. (Currently Amended) A liquid filter assembly according to ~~any one of claims 14-16~~ claim 14 wherein:

- (a) the filter cartridge is in accord with claim 5;
  - (i) the first inner seal member on the seal support being sealed to an outer portion of the upper section of the frame piece of the valve sub-assembly having a first outer diameter; and,
  - (ii) the second inner seal member on the seal support being sealed to an outer portion of the upper section of the frame piece of the valve sub-assembly having a second outer diameter;
    - (A) the second outer diameter being longer than the first outer diameter.